

new w/o to chg flN# 66528

Work Order ID 61380

August 23, 2010 9:00:17 AM

Item ID: D6017-115
Revision ID: -125
Item Name: Crosstube Material

new flN per ECU 11-504
D6015-125

Accept

Setup Start
Stop

Start Date: 8/23/10 Start Qty: 70.00
Required Date: 10/22/10 Req'd Qty: 70.00

Cust Item ID:
Customer:

Reference:

Approvals: Process Plan: CL Date: 10/18/23 Tooling: Date:
QC: Date: SPC (Y/N): Date:

Run Start
Stop

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| Draw Nbr | Revision Nbr | | | | | | | | |
| D6017 | Rev A | | | | | | | | |

100 PURCHASING 0.00



Purchasing

Memo
Issue P/O: 12437 a) Description: 4130 Seamless Steel Tube b)
2.339"OD X 2.00" ID X 125" Long c) Tolerance on all dimensions are as per
Dwg D6017 d) Material: AISI 4130 (AMS 6371) Seamless tube Material
certification required x 125"

10.09.22

CL 10/18/23 (70)

110 Receive & Inspect for Damage & Mat'l Certs 0.00



Packaging

Memo
Ensure material certification is attached

10/11/05 (64)

120 QC6- Inspect dimensions to drawing 0.00



QC

Memo

Quality Control

10.11.03 / 10/14/05 (64)






* See last Page Attached
Per results of ultrasonic
measur.



Work Order ID 61380



August 23, 2010 9:00:17 AM



Page 2

Item ID: D6017-115 Accept  Setup Start 
Revision ID: Stop 
Item Name: Crosstube Material
Start Date: 8/23/10 Start Qty: 70.00  Cust Item ID:
Required Date: 10/22/10 Req'd Qty: 70.00  Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start 
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop 

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--|--|----------------------|---------|--------|--------------|---------------|---------------|------------------|-------------------------------|
| 130  Packaging Packaging | Identify as per dwg & Stock Location: _____ Memo <i>Bank Hall</i> | 0.00 0.00 | | | | | | | <i>BB</i> 10/11/08 |
| 140  QC Quality Control | QC21- Final Inspection - Work Order Release Memo | 0.00 0.00 | | | | | | | 10/11/08 <i>MF</i> 10-12-5 |

Picklist Print

August 23, 2010 9:00:16 AM

Page 1

Work Order ID: 61380



Parent Item: D6017-115



Parent Item Name: Crosstube Material



Start Date: 8/23/10

Required Date: 10/22/10

Start Qty: 70.00

Required Qty: 70.00

Comments: IPP Rev:A New Issue 06-06-09 JLM

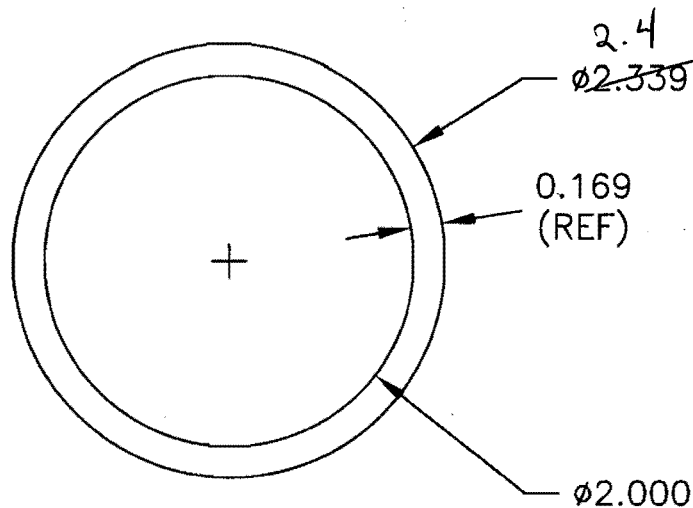
| Component Item ID/ Item Name | Replacement Item ID | Mfg/ Purch | Bin Item | Primary Location | Last Location | Route Seq ID | Unit of Measure | Qty on Hand | Qty per Kit | Total Qty | Qty Issued | Date Issued | Status |
|--|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|--|---------------|---------------|----------------|--------|
| D6017-115P  Crosstube Material | | Purchased | No | | | 110 | Each | 0.0000 | 1  | 70 | | | |

Per 10/11/10 167

DART

| | | | |
|---------------------|-----------------------|---|------------------------|
| DESIGN <i>qp</i> | DRAWN BY <i>qp</i> | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| CHECKED <i>#</i> | APPROVED <i>#</i> | DRAWING NO. D6017 | REV. A SHEET 1 OF 1 |
| DATE 06.06.30 | | TITLE CROSSTUBE MATERIAL SCALE 1:1 | |
| A | 06.06.30 | NEW ISSUE | |

SPECIFICATION CONTROL DRAWING



NOTES

- 1) D6017-XXX CROSSTUBE
LENGTH

WHERE XXX IS LENGTH IN INCHES
EG. 115" LONG TUBE: D6017-115 125"

- 2) MATERIAL: AISI 4130 (AMS 6371) SEAMLESS STEEL TUBE
2.339 OD x 2.000 ID
ANNEALED

- 3) TOLERANCES ARE PER ASTM A519 AS FOLLOWS:

O.D.: +0.007/-0.000

I.D.: +0.000/-0.007

LENGTH: XXX +0.188/-0.000

STRAIGHTNESS: 0.010" DEVIATION / 12" LENGTH

- 4) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

RELEASED06.08.15 *#*

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Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PO REPRINT

Purchase Order ID PO12437

Purchase Order Date 8/23/10

PO Print Date 10/19/10

Page Number 1 of 2

Order From :

VU-FAC001

FACTORY STEEL
14020 OAKLAND AVE.
DETROIT,, MI 48203
US

RECEIVED \$

Contact Name

Vendor Phone 313 883 6300

Vendor Fax 313 883 4883

Vendor Account Nbr

Buyer

Chantal Lavoie

Requisition Nbr

Tax Resale Nbr 10127-2607

Terms

Net 30

Currency

USD

FOB

Ship To :

DART AEROSPACE LTD

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

RECEIVED

| Line Nbr | Reference Revision ID Vendor Part Number | Description/ Mfg ID | Req Date/ Taxable | Req. Qty/ Unit of Measure | Ship Method | Unit Price | Extended Price |
|----------|--|---|----------------------|------------------------------|-------------|------------|-------------------|
| 1 | D6017-115P | Crosstube Material | 10/22/10 Yes | 64.00 Each | | \$154.7648 | \$9,904.95 |
| | | Special Inst: EXTRUDE: AS PER DWG D6017 REV. A B61380 MATERIAL: AISI 4130 (AMS 6371) SEAMLESS STEEL TUBE SIZE: 2.400 OD X 2.000 ID ANNEALED 125" LONG TOLERANCES ARE PER ASTM A519 AS FOLLOWS: O.D: +0.007/-0.000 I.D.: +0.000/-0.007 LENGTH: 115" +0.188/-0.000 STRAIGHTNESS: 0.010" DEVIATION / 12" LENGTH EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF TUBE. THE OUTSIDE SURFACE MUST BE | | | | | |

10/19/10

PACKING LIST

No. 22346

PG 1 OF 1

PL

| | | | | | | | |
|---|--|---|--|--|--|---------------------------|--|
| FACTORY STEEL & METAL SUPPLY 14020 OAKLAND AVENUE DETROIT, MI 48203 | | PURCHASE ORDER # 12437 | | BUYER CHANTEL CLAVOIE | | SHIP DATE 10/21/2010 | |
| (313)883-6300 PHONE (313)883-4883 FAX | | JOB NAME | | Tel (613) 632-3336 Fax (613) 632-4443 | | SHIP VIA ****TRUCK**** | |
| SOLD TO DART AEROSPACE 1270 ABERDEEN STREET HAWKESBURY, ON K6A 1K7 | | SALES ORDER # 18434 | | ORDER DATE 08/23/2010 | | SALES REP MICK HALON | |
| | | SHIP TO DART AEROSPACE 1270 ABERDEEN STREET HAWKESBURY, ON K6A 1K7 | | CARRIER TST OVERLAND | | RESALE # 59-2958719 | |
| | | | | PRO# | | SHIP INST | |
| | | | | TERMS NET 30 DAYS | | BLIND Y/N N | |
| | | | | | | FOB DETROIT | |

| LINE | PCS | QUANTITY | DESCRIPTION | WIDTH | LENGTH | WEIGHT | UNIT PRICE | TOTAL |
|------|-----|------------|---|-------|--------|-----------|------------|-------|
| 1 | 64 | 666.667 FT | RD-N.2400200 4130N CD SMLSS RD TUBE 2.400" OD X .200W Our Tag # Heat # 57571 00A101448 Pcs Total Ft 64 666.667 | | 125" | 3,133.334 | | |
| 2 | 1 | | WOODB WOOD SHIPPING CRATE MTRS (CIRCLE) FAX SHIPMENT INVOICE ALL DATE: INITIAL: | | | | | |

| | | | |
|-------------------------|----------------------------|---------------|--|
| TOTAL WT 3,133 LBS | | TOTAL | |
| RECEIVED BY - SIGNATURE | RECEIVED BY - PRINTED NAME | DATE RECEIVED | |

SO



TEST REPORT

SHIPMENT

001

5085

MICHIGAN SEAMLESS TUBE

SOUTH LYON, MICHIGAN 48178

| ORDER NUMBER | CUSTOMER ORDER NUMBER | DATE | OFC | COM | DI WI | NET SLS | GR SLS | ACCOUNT NUMBER | US | PAGE |
|--------------|-----------------------|----------|-----|-----|-------|---------|--------|----------------|-----|------|
| 044843 | 1208 | 08/24/10 | 22 | 00 | 16 | 16 | 01 | 02598001FCO | 2ME | 1 |

S
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FACTORY STEEL & METAL SUPPLY
14020 OAKLAND
DETROIT MI USA 48203

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FACTORY STEEL & METAL SUPPLY SN
14020 OAKLAND AVENUE TR
DETROIT MI 48203 INV

ROUTING

OPEN TOP/FULLY TARPED/FOB SOUTH LYON MI

PPD TRUCK

| ANALYSIS | SHAPE | PRODUCT | FC | ANNEAL | REQUESTED |
|---------------------------|-------|------------|-------------------|----------|-----------|
| 4130 | ROUND | COLD DRAWN | | PER SPEC | 10/15/10 |
| SPECIFICATION | | CMST | DESCRIPTION | | PROMISE |
| SEAMLESS ASM-6371/A519 | | | CD ALLOY AIRCRAFT | | 10/15/10 |

SPECIAL INSTRUCTIONS

OIL DEAR COMP.MARK/CERT A519-96,MILT-6736BN NOTE-2,AMS-6360L,
AMS-6371J,AMS-T-6736AN,4130-H.CERT TO AMS-2301J.DECARB LEVELS TO
AMS-6371.PROD FROM 1-HT.80M PSI MIN YLD/AIM 90 PSI.STRT/SURFACE
CRITICAL.NO MARKS.CIRCUMFERENTIAL GRIND MARKS UNACCEPTABLE.KERF
+.188"/-0.QTY VAR +10%/-0.MARK TO INCL GRADE & ALL SPECS.BOXED.

| ITEM | QUANTITY | O.D. | I.D. | WALL | LENGTH | WT/FT | WEIGHT | |
|------|----------|--------|--------|------|--------|-------|--------|----------|
| | | 2.400 | 2.000 | | | 4.699 | | 09:45:26 |
| | | +.0070 | +.0000 | | | | | 10/18/10 |
| | | -.0000 | -.0070 | | | | | |

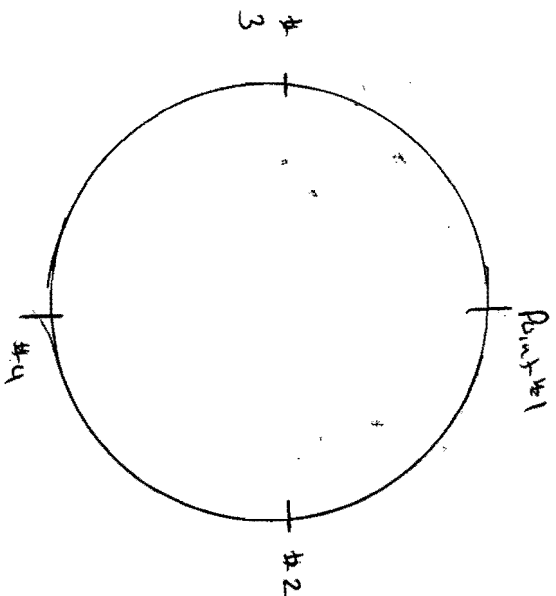
| ITM | BALE | --BALE-- | | | | ITM | PART |
|-----|------|----------|-----|-----------|----------------|--------|--------|
| NUM | NUM | PCS | FTG | HEAT NO. | LENGTH | STATUS | NUMBER |
| 1 | 1 1 | 21 | 219 | 00A101448 | CUT 10' 5.000" | COM | |
| 1 | 2 1 | 21 | 219 | 00A101448 | CUT 10' 5.000" | COM | |
| 1 | 3 1 | 22 | 229 | 00A101448 | CUT 10' 5.000" | COM | |

| HEAT NO. | C | Mn | P | S | Si | Ni | Cr | Mo | Cu | Al | REMARKS |
|-----------|------|------|------|------|------|------|-------|------|------|------|---------|
| 00A101448 | .330 | .490 | .014 | .018 | .250 | .080 | 1.010 | .170 | .200 | .027 | EF SDI |

| HEAT NO. | ULT. STR. PSI | YIELD, PSI | % ELONG 2" | HARDNESS | HYDRO TEST PSI | ULTRA SONIC % | EDDY CURRENT | EXPANSION | | |
|-----------|---------------|------------|---------------|-------------|----------------|---------------|--------------|-----------|--------------|--------|
| 00A101448 | 98,541 | 89,019 | 18.7 | HBW 217-217 | | | OK | | | |
| | | | | | BEND | FLATTEN | | FLARE | REV. FLATTEN | FLANGE |
| | | | | | | | | | | |

DECARB OK GRAIN SIZE 7
FREQ 0.00 SEV 0.00
MACROS S1 R1 C2
J1 J2 J3 J4 J5 J6 J7 J8 J9 J10
52 52 51 47 44 39 38 36 34 33
MELTED & MANUFACTURED IN USA

We hereby certify that the reported data are correct according to Michigan Seamless Tube tests and those of its suppliers.



taken in middle of
tube.

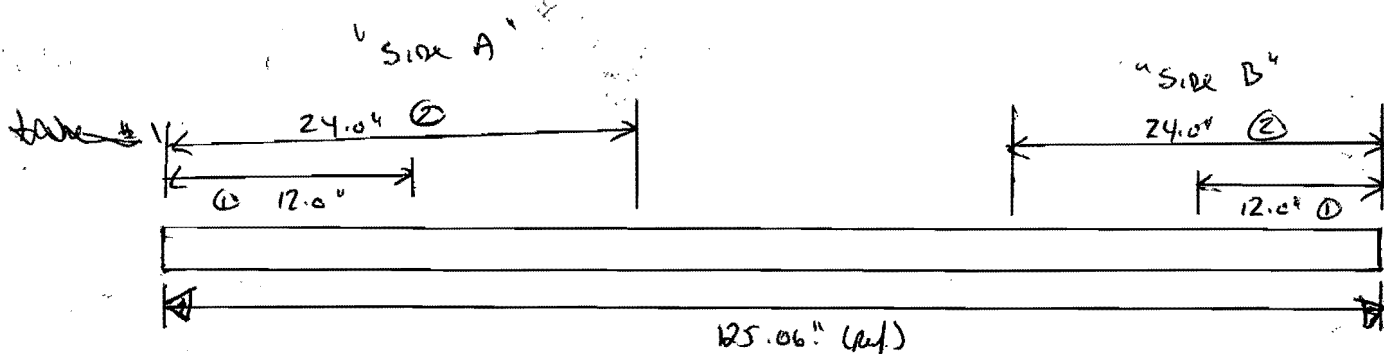
tube length = 125.0"
center = 62.5"

| | tube #1 | tube #2 | tube #3 | tube #4 | tube #5 | tube #6 | |
|---------|---------|---------|---------|---------|---------|---------|--|
| 1. | .200 | .700 | .202 | .703 | .205 | .209 | |
| 2. | .706 | .704 | -.206 | .708 | .703 | .703 | |
| 3. | .709 | .709 | .706 | .707 | .706 | .707 | |
| 4. | .119 | .210 | .204 | .710 | .200 | .700 | |
| tube #7 | | | | | | | |
| 1. | .203 | .207 | .210 | .202 | .205 | .207 | |
| 2. | .208 | .205 | .202 | .206 | .202 | .207 | |
| 3. | .205 | .211 | .209 | .204 | .211 | .209 | |
| 4. | .205 | .204 | .204 | .207 | .208 | .208 | |

measured by.

10/11/02

tube straightness



| | tube #1 | tube #2 | tube #3 | tube #4 |
|----|-------------------------|---------|---------|---------|
| 1. | .005 .008 | .001 | .004 | .002 |
| 2. | .009 | .004 | .0075 | .0035 |
| 1. | .005 | .002 | .007 | .003 |
| 2. | .0085 | .003 | .006 | .005 |

"Side A"

"Side B"

Acceptable
CP 10/1/03